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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/777,314

02/07/2001

Tomohiro Konishi

55577(820)

3382

7590

07/16/2004

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EXAMINER

SELBY, GEVELL V

ART UNIT

PAPER NUMBER

2615

DATE MAILED: 07/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/777,314	Applicant(s) KONISHI, TOMOHIRO	
	Examiner Gevell Selby	Art Unit 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/30/03</u> | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 4-6, and 8 rejected under 35 U.S.C. 102(b) as being anticipated by Parulski et al., US 5,440,343.**

In regard to claim 1, Parulski et al., US 5,440,343, discloses a solid-state image pickup device comprising:

a plurality of light receiving sections (see figure 4, element 40) formed on a semiconductor substrate (see column 4, line 34), vertical transfer sections (see figure 4, element 44) for transferring charges read from the light receiving sections in a vertical direction (see column 5, lines 1-21) and a horizontal transfer section (see figure 4, element 42) for transferring charges transferred by the vertical transfer sections in a horizontal direction (see column 5, lines 25-30),  
wherein said solid-state image pickup device is provided with a charge discharge gate (see figure 4, element 46) which is formed adjacent to a connection

of the vertical transfer section and the horizontal transfer section and depletes charges in the vertical transfer section and a charge discharge drain (see figure 3, element 38) formed adjacent to the charge discharge gate (see column 4, lines 32-34), and

signal charges in an arbitrary vertical transfer section are discharged from the charge discharge gate to the charge discharge drain by applying a voltage to the charge discharge gate in an arbitrary timing (see column 4, lines 3-20).

In regard to claim 4, Parulski et al., US 5,440,343, discloses the solid-state image pickup device according to claim 1, wherein the discharge gate covers at least part of the vertical transfer section (see figure 4, elements 44 and 46).

In regard to claim 5, Parulski et al., US 5,440,343, discloses the solid-state image pickup device according to claim 1, wherein a voltage applied to the discharge drain is made variable and a drive timing of a voltage applied to the discharge drain is synchronized with a drive timing of a voltage applied to the discharge gate (see column 5, lines 1-35: In still mode, all the drains are disabled and no voltage is applied. In motion mode, the timing of the voltage applied to the drains is varied in to eliminate all the charges of a specific line.).

In regard to claim 6, Parulski et al., US 5,440,343, discloses the solid-state image pickup device according to claim 5, wherein a pulse width applied to the discharge drain covers at least a pulse applied to the discharge gate in a discharge operation mode where the discharge drain is driven while synchronized with driving of the discharge gate.

It is inherent in the Parulski reference (see column 5, lines 1-21) that when the gate signal is activated, the charges are transferred to the drain for at least the entire pulse of the signal or else all the charges will not be discharged.

In regard to claim 8, Parulski et al., US 5,440,343, discloses the solid-state image pickup device according to claim 1, wherein the vertical transfer section provided with the discharge drain and the vertical transfer section not provided with the discharge drain are arbitrarily set and the combinations of the set discharge drains are arranged on a plurality of stages in the vertical direction (see figure 4 and column 5, lines 1-21).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parulski et al., US 5,440,343, in view of Kamimura, US 5,357,129.**

In regard to claims 2 and 3, Parulski et al., US 5,440,343, discloses the solid-state image pickup device according to claim 1, wherein a layer (drain 38) directly under the gate is formed under the discharge gate positioned between the vertical transfer section and the discharge drain (see figure 12 and column 4, lines 32-34).

Parulski does not disclose that the layer has the same conductive type as that of the vertical transfer section or that the discharge drain and the vertical transfer section are formed in the same process.

Kamimura, US 5,357,129, discloses a solid state imaging device wherein the same photolithography process is performed for patterning to form the source and drain regions of the driver transistor T1 and the vertical transfer section 22 (see column 7, lines 57-61). The n-type semiconductor layer 14 and the p-type semiconductor layer 15 are formed by simultaneously implanting ions both in the source and drain regions of transistor T1 and in the vertical transfer section 22 (see column 7, lines 61-66).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Parulski et al., US 5,440,343, in view of Kamimura, US 5,357,129, to have the drain have the same conductive type as that of the vertical transfer section and have the discharge drain and the vertical transfer section formed in the same process in order not to have a complex process in fabrication as taught by Kamimura (see column 8, lines 10-19).

**6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parulski et al., US 5,440,343, in view of Reich et al., US 5,270,558 and Parulski et al, US 5,828,406.**

In regard to claim 7, Parulski et al., US 5,440,343, discloses the solid-state image pickup device according to claim 1. Parulski et al., US 5,440,343, does not disclose that one discharge drain is provided between the neighboring vertical transfer sections and signal charges in the two vertical transfer sections positioned on both sides of the

discharge drain are discharged to this one discharge drain via the discharge gate provided adjacent to the vertical transfer sections.

Reich et al., US 5,270,558, discloses a solid state image pickup device with shutter drain regions (see figure 2, element 15) positioned between the vertical transfer channels in the imaging array (see column 4, lines 13-16). During shutter close mode, the incoming charge is drained from the substrate via expanded drain depletion regions allowing for rapid shutter operation and elimination of smear (see column 5, line 63 to column 6, line 12).

Parulski et al, US 5,828,406, discloses a solid state image pickup device wherein charge from adjacent vertical transfer registers are transferred from the CCD to the sensor substrate through one fast dump drain (see figure 3, element 72) rather than to the horizontal register, allowing lines of charge to be eliminated (see column 6, lines 13-21).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Parulski et al., US 5,440,343, in view of Reich et al., US 5,270,558, and Parulski et al, US 5,828,406, to have the one discharge drain as claimed in claim 7, in order to allow charges to be eliminated quickly and to eliminate smear.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following art discloses a solid-state imaging device with a discharge gate and drain: US 4,513,313,



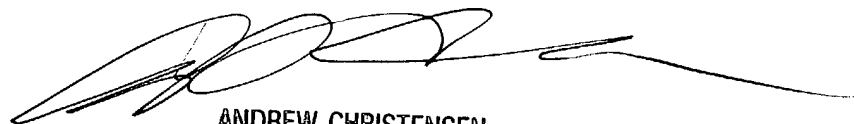
US 4,912,560.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gevell Selby whose telephone number is 703-305-8623. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's primary, Ngoc-Yen Vu can be reached on 703-305-4946. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gvs



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